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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/607,870

06/27/2003

Kentin L. Alford

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EXAMINER

JOLLEY, KIRSTEN

ART UNIT

PAPER NUMBER

1792

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DELIVERY MODE

04/27/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/607,870	<b>Applicant(s)</b> ALFORD ET AL.	
	<b>Examiner</b> Kirsten C. Jolley	<b>Art Unit</b> 1792	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 February 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-6,14-18,30 and 32-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,14-18,30 and 32-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 9, 2009 has been entered.

### ***Priority***

2. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosures of the prior-filed applications, Application Nos. 10/346,866, 09/528,345, and 09/272,762, fail to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application.

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The priority date of all claims are only entitled to the filing date of the instant application of June 27, 2003.

Independent claim 1 was amended to include the limitation “in a supercritical or non-supercritical fluid comprising one or more members of the group consisting of ammonia, hydrocarbons and aromatic compounds.” The use of hydrocarbons and aromatic compounds were not disclosed in the earlier parent applications. (While the parent application 09/272,762, having a filing date of March 19, 1999, discloses use of alkanes, alkenes, and alkynes as the supercritical fluid on page 6, these groups of compounds do not make up the entire claimed genus of “hydrocarbons.” According to Hawley’s Condensed Chemical Dictionary, 14<sup>th</sup> Edition, the term “hydrocarbons” is also inclusive of alkadienes, acyclic terpenes, alicyclic compounds, aromatic compounds, and cyclic terpenes.)

Independent claim 30 was amended to include the limitation “comprising one or more members of the group consisting of ammonia, freons, nitrogen, noble gases, noble gases, hydrocarbons and aromatic compounds.” The use of hydrocarbons and aromatic compounds were not disclosed in the earlier parent applications, nor was the use of non-supercritical fluid.

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Additionally, it is noted that dependent claims 3-6, 16-18, and 34-37 contain limitations that were not disclosed in the parent applications (i.e., the specific pressures claimed, use of glass or carbon or silicon wafer or silicon carbide, or broad aluminum-comprising or titanium-comprising substrates, as well as claimed exposure times).

### ***Response to Arguments/Amendments***

3. The 35 USC 103(a) rejections over the prior art of Mankell et al. in view of Combes et al., and further in view of Tutin et al. or Buck have been withdrawn in response to Applicant's amendments to the claims requiring utilization of a supercritical fluid (or non-supercritical fluid with respect to claim 30) selected from the group consisting of ammonia, hydrocarbons and aromatic compounds (as well as freons, noble gases, and nitrogen with respect to independent claim 1). The Combes et al. reference exclusively teaches use of carbon dioxide as the supercritical fluid and does not teach or fairly suggest use of one of the above claimed fluids alone or in combination with carbon dioxide.

4. With respect to the 35 USC 103(a) rejections over Mankell et al. in view of Fukushima et al. and further in view of Tutin et al. or Buck, Applicant argues that the amended claims recite utilization of a supercritical fluid (or non-supercritical fluid with respect to claim 30) selected from the group consisting of ammonia, hydrocarbons and aromatic compounds (as well as freons, noble gases, and nitrogen with respect to independent claim 1), and that not one of the cited references discloses or suggests this limitation. The Examiner disagrees. Fukushima discloses that there may be co-solvents to the compressed carbon dioxide solvent including ammonia, propylene, propane, pentane, and benzene (paragraph [0032]). Applicant's use of

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“comprising” claim language in claims 1 and 30 (“in a supercritical [or non-supercritical] fluid comprising one or more members of the group consisting of ...” [emphasis added]) render the claim broad enough to read on the use of carbon dioxide in combination with one of the solvents as a co-solvent. Therefore the rejections over Mankell et al. in view of Fukushima et al. and further in view of Tutin et al. or Buck are maintained, as set forth below. Further, this rejection is applied to all claims since, as discussed above, priority of all claims is limited to the filing date of the instant application.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-6, 14-18, 30, and 32-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mankell et al. (US 2002/0127399) in view of Fukushima et al. (US 2002/0197879), and further in view of Tutin et al. (US 2004/0034154) or Buck (US 6,039,821).

Mankell et al. discloses a method of providing a glass fiber having a surface, and coating the glass fiber with a compound containing functionalized silicon including an organic group covalently attached with the silicon. Mankell et al. teaches that the coating compound is preferably an alkyl silyl halide, such as octadecyl trichlorosilane or dimethyldichlorosilane (paragraphs 0015 and 0016). Mankell et al. further teaches that the coating compound may be applied to the glass fiber prior to or at the same time as the addition of binder to the fiberglass

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during the formation of fiberglass batts (paragraph 0018). While Mankell et al. does not specifically state that the coating compound is applied as a monolayer, it is noted that the bonding mechanisms taught by Mankell et al. in paragraph 0015 are similar to those used in monolayers – namely, a compound with a first group that has functionality capable of interacting with the Si or OH groups on the fiberglass substrate surface, and another functional group (at the opposite end) having hydrophobic properties, thus providing hydrophobic properties to the coated substrate.

Mankell et al. lacks a teaching of exposing the glass fiber surface in a supercritical fluid. Fukushima et al. is cited for its teachings of methods for forming a monolayer of functionalized silicon including an organic group on a substrate surface. Fukushima et al.'s method comprises exposing the substrate surface to a silane precursor using supercritical or compressed carbon dioxide as a solvent, as well as co-solvents to the carbon dioxide (paragraph [0032]), the precursor interacting with the substrate to form the monolayer across the surface of the substrate. Fukushima et al. teaches that its process is useful on glass substrates (paragraph 0020), and results in an inexpensive, non-toxic and non-flammable process which facilitates formation of monolayers having good quality and surface integrity (paragraphs 0012-0013). Further, Fukushima et al. teaches use of  $\text{Si}(\text{CH}_2\text{CH}_3)_2\text{Cl}$  as a preferred monolayer compound (paragraph 0016), which is materially similar to the preferred coating compounds taught by Mankell et al. Fukushima et al. discloses the equivalence of using either compressed or supercritical carbon dioxide as a solvent, and teaches that both solvents achieve successful results and the term “compressed carbon dioxide” is intended to also include supercritical carbon dioxide (paragraph [0053]). As to the co-solvents, Fukushima discloses that they may include ammonia, propylene,

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propane, pentane, and benzene, among others, and that use of a co-solvent may provide improvements in monolayer formation including faster and denser packing of the molecules constituting the monolayer (paragraph [0032]).

It would have been obvious for one having ordinary skill in the art, seeing the references of Mankell et al. and Fukushima et al. in combination, to have used supercritical or compressed carbon dioxide as the solvent for applying the functionalized silicon compound on fiberglass fibers in the process of Mankell et al. with the expectation of improved quality and integrity of the coating, and because it is an inexpensive, non-toxic, non-flammable application process. Further, one having ordinary skill in the art would have expected successful results since Mankell et al. is not limited to the application method used and teaches that the coating composition can be applied in a suitable carrier (paragraph 0018), as well because Mankell et al. and Fukushima et al. both teach coating of similar alkyl halyl silanes compounds on glass substrates.

It would have further been obvious to one having ordinary skill in the art to have included one of the disclosed co-solvents such as ammonia or alkanes or aromatic compounds in addition to supercritical carbon dioxide as the supercritical or compressed fluid medium in the process of Mankell et al. upon seeing the teachings of Fukushima et al. that the use of a co-solvent may provide improvements in monolayer formation including faster and denser packing of the molecules constituting the monolayer. Applicant's use of "comprising" claim language ("in a supercritical [or non-supercritical] fluid comprising one or more members of the group consisting of ..." [emphasis added]) render the claims broad enough to read on the use of carbon dioxide in combination with one of the solvents as a co-solvent. The Examiner additionally



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notes that the test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Hedges*, 783 F.2d 1038.

Mankell et al. further lacks a teaching that incorporation of the glass fiber into a fiberglass matrix is performed by bonding the organic group within a polymeric material. Mankell et al. discloses that a binder composition conventionally used in the fiberglass industry is applied to the fiberglass matrix either after, or at the same time as, its coating composition (paragraph 0018). Tutin et al. and Buck are cited for their teachings of the conventionality of using epoxy resins as binders in fiberglass batts/matrices (see abstract of Tutin et al., and abstract and col. 11, lines 17-20 of Buck). It would have been obvious for one having ordinary skill in the art to have selected any conventional fiberglass binder, including an epoxy binder as taught by Tutin et al. or Buck, in the fiberglass batt construction process of Mankell et al. with the expectation of successful results, since Mankell et al. specifically states that any conventional binder may be used and is not limiting. It is noted that the use of Mankell et al.'s composition in combination with an epoxy polymeric binder would necessarily include covalent bonding of the organic group of the Mankell et al.'s coating composition within the polymeric binder, since the process of Mankell et al. and applicant use materially similar monolayer/coating materials. This is evidenced by Applicant's own specification in paragraph 0057, which discloses that epoxy polymers have covalent interactions with the monolayers of its invention.

As to claims 3-6 and 34-37, Fukushima et al. teaches an exemplary pressure of 1500 psi in Example 3. However Fukushima et al. states "the pressure and/or temperature of the

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compressed carbon dioxide is/are selectively controlled so as to enhance the density of the self-assembled monolayer on the substrate” (paragraph 0016). Fukushima et al. also states in paragraph 0053 “as used in the context of the present invention ... the term compressed carbon dioxide is intended to include also supercritical carbon dioxide.” Therefore Fukushima et al. teaches that the pressure would be optimized through routine experimentation. It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

As to claim 14, Fukushima et al. teaches the presence of water across a surface of the substrate in paragraph 0044.

As to claim 15 and 32-33, Mankell et al. teaches that the coating compound is preferably an alkyl silyl halide, such as octadecyl trichlorosilane or dimethyldichlorosilane (paragraphs 0015 and 0016).

As to claims 16-18, Fukushima et al. teaches exposing the substrate to the precursor molecules for a time of two hours, which meets the claimed limitations.

#### ***Allowable Subject Matter***

7. Claims 1, 14-15, 30, and 32-33 would be allowable over the prior art of record if the limitations of “hydrocarbons” and “aromatic compounds” are removed from line 8 of independent claim 1, and “hydrocarbons” and “aromatic compounds” as well as the phrase “or non-supercritical” are removed from lines 7-9 of independent claim 30. Deletion of these terms would give claims 1, 14-15, 30, and 32-33 priority to the filing date of parent application

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09/272,762 which has a filing date of March 19, 1999, and thus pre-dates the Fukushima et al. reference.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C. Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Tuesday and Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kirsten C Jolley/  
Primary Examiner, Art Unit 1792

kcj